Studies on the Freshwater Oligochaeta of South India

I. Aeolosomatidae and Naididae

PART 2

BY

K. VANAMALA NAIDU

Government Arts and Science College, Chittoor (A.P.)

(*With five text-figures*)

[*Continued from Vol.* **58** (3) : 652]

Family NAIDIDAE

KEY TO ALL THE SUBFAMILIES OF NAIDIDAE

A-1 Nephridia absent ..	[1] Paranaidinae
A-2 Nephridia present	
B-1 Segment III strongly elongated ; no pharyngeal diverticulum ; none to one pair of commissural vessels ..	Chaetogastrinae
B-2 No specially elongated segments ; pharynx with dorsal diverticulum ; 4 or more pairs of commissural vessels, simple, branched or forming plexus	
C-1 Dorsal setae begin in IV, V, or VI ..	Naidinae
C-2 Dorsal setae usually begin in II (in *Pristina macrochaeta* in III or IV)	
D-1 Four segments budded at anterior end by budding zone ; testes in IV and ovaries in V ..	[2]Stephensonianinae *nov.*
D-2 Seven segments formed at anterior end by budding zone ; testes in VII and ovaries in VIII ..	Pristininae

[1] Members of this subfamily are not recorded from the Indian sub-continent.
[2] Represented by one genus only.

a. Subfamily Chaetogastrinae Sperber, 1948

Key to all the Genera of Chaetogastrinae

Dorsal setae absent ; ventral setae of III-V absent ..	*Chaetogaster*
Dorsal setae present ; ventral setae present throughout ..	[1]*Amphichaeta*

2. Genus **Chaetogaster** von Baer, 1827

Generic characters : Worms whitish and transparent. No eyes. Body surface with fine outgrowths. External segmentation absent. No dorsal setae, ventral setae absent in III-V. Pharynx in II-III, oesophagus in IV, pharyngeal and oesophageal glands absent, stomach conspicuous and barrel-shaped; intestinal anti-peristalsis and ascending ciliary action absent. Septa present, no septal glands. Coelomocytes absent. Dorsal vessel contractile and mid-dorsal ; ventral vessel non-contractile and mid-ventral ; contractile lateral vessels ('hearts') 1 pair in IV. Brain with or without statocyst. Nephridia exonephric, start from VI or VII. Budding zones 1-7.

Key to all the known and valid Species of CHAETOGASTER

A-1 Setae simple-pointed ..	* *setosus*
A-2 Setae double-pointed	
B-1 Setae with strongly curved teeth (at right angles to the shaft) ..	*limnaei*
B-2 Setae with normally curved teeth (at obtuse angles to the shaft)	
C-1 Prostomium conspicuous	
D-1 Sensory hairs long on prostomium ; body size medium (1-5 mm. long) ; setae 4-8 per bundle in II, 3-5 in others ..	*diastrophus*
D-2 Sensory hairs extremely long on prostomium and later segments ; body size small (0.6-1.7 mm. long) ; setae 4-6 per bundle in II, 3-5 in others ..	[4] *palustris*
C-2 Prostomium inconspicuous	
E-1 Distal tooth reduced ..	* *krasnopolskiae*
E-2 Distal tooth of setae longer than proximal	
F-1 Prostomium with median incision	*cristallinus*
F-2 Prostomium without median incision	
G-1 Setae large (145-350 μ long, 4.5 μ thick in II) ..	*diaphanus*

[1] Members of this genus are not recorded from the Indian sub-continent.

G-2 Setae small (60-100 μ long, less than 2 μ thick in II)	
H-1 Pulsatile 'heart' on ventral vessel in IV ; body size (0.5-1.2 mm.) ; setae 4-6 per bundle and 59-73 μ long in II ..	* *parvus*
H-2 Pulsatile ' heart ' absent ; body size 0.8-2.0 mm. ; setae 3-9 per bundle and 63-100 μ long in II ..	*langi*

4. **Chaetogaster diastrophus** (Gruithuisen, 1828)

Fig. 4

Chaetogaster diastrophus (Gruithuisen). Pointner, 1911, p. 629. Lastočkin, 1918, p. 58 ; 1927, p. 65. Svetlov, 1925, p. 472. Cordero, 1931a, p. 349 ; 1931b, p. 333. Hrabě, 1939, p. 209. Chen, 1944, p. 2. Sperber, 1948, pp. 59-62, fig. 3C, 6, 7A B, G, pl. I, fig. 1 ; 1950, p. 52, pl. fig. 1.

Material examined : Many worms collected from the Bugga stream, Cuddapah, in March and December 1955 ; from the Kandakam tank, Bellary, in April 1956.

Worms minute, imperceptible to unaided eye. Prostomium well developed, bluntly pointed with long stiff sensory hair.

Ventral setae bifid with strong proximal noduli, shaft straight above and bent below nodulus. Distal prong longer and thinner than the proximal. Setae of II, 6-7 per bundle, 98 μ long ; in others 4-5 per bundle, 70 μ long.

Mouth ovoid and ventral, always open, gape increasing and decreasing. Oesophagus $\frac{1}{2}$-$\frac{2}{3}$ as long as pharynx. Stomach in V-VI, with transverse vascular loops giving a striped appearance. Intestine yellowish, wide in VII and VIII, narrow behind it. Chloragogues from V onwards with bluish globules. Septa delicate.

Brain incised in front and behind, conspicuous with semi-circular, mid-dorsal, greenish-blue statocyst in living worms. Ventral nerve cord well developed with irregular outline.

Dorsal vessel contractile, contractions starting behind and surging forwards ; ventral vessel non-contractile. Two lateral contractile vessels in IV.

Nephridia from VII on, two per segment, without nephrostomes, compact, consisting of glandular tissue enclosing a long coiled nephridial duct ; ectal duct thick, nephridiopores opening ventro-laterally.

Worms without fission zones rare ; chains composed of 2-5 zooids common. First budding zone always appears between IX and X,

* Species not recorded from the Indian sub-continent.

second zone a segment anterior to it. A chain of 8 zooids had the following composition :

Zooid No.	No. of Segments in the Zooid	Type of Segments
I Zooid	8 VI fission zone	all of parent
II Zooid	3 II fission zone	1 old + 2 new
III Zooid	4 IV fission zone	1 old + 3 new
IV Zooid	3 I fission zone	all new
V Zooid	8 VII fission zone	3 old + 5 new
VI Zooid	1 III fission zone	old
VII Zooid	4 V fission zone	all new
VIII Zooid	2 + undiff. region	2 old + rest new

1(p*) = 1.0-1.2 mm. (chain of 2); d(p*) = 0.1 mm. ; s = 14 ; n = 9.

Distribution in Indian sub-continent : Lake Inle of S. Shan State (Burma) ; Lahore (Pakistan). Now recorded from Cuddapah, Bellary (S. India).

Habits : The worms live in *Spirogyra* and other algae and feed on them.

Remarks : *Chaetogaster punjabensis* Stephenson and *Ch. annandalei* Stephenson, as Chen (1940) and Sperber (1948) pointed out, are undoubtedly *Ch. diastrophus*. *Ch. gulosus* Leidy (1850), with 'a digitiform upper lip', is *Ch. diastrophus* ; length of setae 1/133 inch (= 184 μ) ought to be 1/233 inch (= 108 μ), which evidently as Sperber (1948) suggests is a misprint. The setae cannot be so large for a worm of 2 mm. length.

5. **Chaetogaster langi** Bretscher, 1896

Fig. 5 A—C

Chaetogaster langi Bretscher. Pointner, 1911, p. 629. Lastočkin, 1924, p. 4 ; 1927, p. 65. Pasquali, 1938a, p. 20 ; 1938b, p. 28, fig. 3, 4. Hrabě 1941, p. 3 ; 1952, p. 2. Chen, 1944, p. 2. Svetlov, 1946, p. 103. Berg, 1948, pp. 40, 46, fig. 30c.

* Preserved

Sperber, 1948, pp. 63-65, fig. 7c, H, pl. I, fig. 2 ; 1950, p. 52, pl. I, fig. 2 ; 1958, p. 46.

Chaetogaster pellucidus Walton. Causey, 1953a, p. 55.

Material examined : Many worms collected from the Bugga stream, Cuddapah, in April 1955 ; from the Kandakam tank, Bellary, in May 1954.

Worms (Fig. 5A) minute. Prostomium inconspicuous with rounded margin, fringed with sensory hairs.

Setae (Fig. 5B, C) 4 per bundle, 63-77 μ long in II, 42-52 μ long in others, have conspicuous proximal nodulus, shaft below it is bent. Prongs equally thick, distal longer and more curved than the proximal.

Mouth subterminal, ovoid, always open, gape increasing and decreasing. Oesophagus half as long as the pharynx and narrow. Stomach in V-VI, yellowish, barrel-shaped with transverse vascular loops. Pharynx and stomach push septa 3/4 and 4/5 into IV. Intestine begins in VII, yellowish. Septa present.

Brain slightly opaque, without statocyst.

Dorsal contractile and ventral non-contractile vessels are median, above and below the gut ; two contractile lateral vessels in IV.

Nephridia 2 per segment, exonephric, from VI or VII onwards, consisting of a glandular mass and a coiled nephridial duct.

The worms have 1-3 fission zones. In a chain of 3 zooids, the earliest formed zone is between IX and X, the next formed zone a segment in front of it. Sexual worms not encountered.

1 (p) = 1 mm. (chain of 2) ; d (p) = 0.1 mm. ; s = 10-15 ; n = 9.

Distribution in Indian sub-continent : Calcutta (N. India) ; Khandala (W. India). Now recorded from Cuddapah, Bellary (S. India).

Habits : When pebbles with encrustations of plant and animal material were left in beakers for two days, these worms appeared on the wall of the containers. They were never found in the algae and other aquatic plants.

Remarks : *Chaetogaster spongillae* Annandale (1906) is a synonym of *Ch. langi* as pointed out by Chen (1940) and Sperber (1948), for the length of the oesophagus is a variable character in the same species as pointed out by Pointner (1914) and Sperber (1948, pp. 58 and 64).

Ch. pellucidus Walton (1906) from N. America with a length of 1.5 mm. and 12 or more stomachal ducts is a synonym of the species.

6. **Chaetogaster cristallinus** Vejdovsky, 1883

Fig. 6 A—H

Chaetogaster crystallinus Vejdovsky. Pointner, 1911, p. 629. Lastočkin, 1918, p. 58 ; 1924, p. 4 ; 1927, p. 66. Svetlov, 1925, p. 472. Hrabě, 1939, p. 209. Chen, 1944, p. 2. Sperber, 1948, pp. 68-71, fig. 7E, K, pl. I, fig. 3, pl. II, fig. 1-3 ; 1950, p. 53, pl. I, fig. 3.

Material examined: Many worms collected from the Bugga stream, Cuddapah, in January 1954, December 1955 ; from Langford Town tank, Bangalore, in May 1958.

Worms (Fig. 6A) very much larger than *Ch. langi* and *Ch. diastrophus*. Prostomium (Fig. 6B, C) inconspicuous with a median incision and with sensory hairs of 2 lengths, longer alternating with shorter.

Ventral setae (Fig. 6 D) in II, 6-7 per bundle, 180 μ long ; in others 2-6 per bundle, 119-140 μ long and have strong proximal nodulus (D : P : : 32 : 16 in II, 22 : 16 in others), with shaft straight above and bent below nodulus ; prongs curved, distal longer than the proximal in all. Length and position of nodulus vary from seta to seta in each bundle.

Mouth circular and subterminal. Pharynx thick-walled, spinose externally. Oesophagus thin and S-shaped with longitudinal wrinkles and lumen closed when empty, distending during food passage. Stomach in V—½VII, barrel-shaped with 26-30 transverse vascular loops giving striped appearance, narrow anteriorly, widening abruptly behind, its wall contracting near septa forming 3 temporary compartments in deflation, disappearing in inflation. Intestine yellowish, wide in ½VII—VIII and narrow behind.

Brain (Fig. 6E, F) with a median statocyst, bluish, with gray granules in and around it in the young worms, without granules in the older worms. Nerve ring (Fig. 6G) thick, ventral nerve cord with well developed ganglia, free from the bodywall.

Dorsal vessel mid-dorsal, contractile ; ventral vessel mid-ventral and non-contractile ; one pair of contractile transverse vessels in IV.

Nephridia exonephric, start in VII, attached to body-wall near setal bundles, (Fig. 6H) composed of irregular glandular mass, enclosing highly coiled nephridial duct, opening by nephridiopore near the setal bundles. No ciliary vibrations in nephridial duct.

Worms with 2-5 zooids common. In a chain of 5 zooids I, II, III, IV formed budding zones are between X and XI, VIII and IX, XV and XVI, and XIX and XX respectively. I to V zooids are each composed of 8, 2, 5, 4, and 6 segments respectively.

l (living) = 5 — 6 mm. (chains) ; d (living) = 0.3 — 0.6 mm. ; s = 12 — 16 ; n = 10.

Lengths of longest ventral setae in μ and position of nodulus in the ratio D : P : :

	II	VI	VII	VIII	IX	X	XI	XII
Crotchet	168	136.5	133	133	133	133	122.5	126
	32 : 16	23 : 16	22:16	22:16	23 : 15	21 : 14	21 : 16	20 : 16

Distribution in Indian sub-continent : Calcutta (N. India). Now recorded from Cuddapah, Bangalore (S. India).

Habits : The worms live among filamentous algae, *Spirogyra* etc., and contain bits of algal filaments, protozoans, rotifers, crustaceans, and oligochaetes in their gut. Those in captivity contained in the gut, pieces of the body and setae of their kin.

Commensals : Vorticellids are attached to the body of many worms.

Parasites : Several unidentified spherical ciliate parasites with blue-green inclusions are found in the gut.

Remarks : *Chaetogaster* sp. Annandale (Stephenson, 1923), with a length of 2-3 mm.; n = 8 or 9 ; anterior end ' somewhat truncated ', cerebral ganglion containing a densely pigmented mass (statocyst), is no doubt *Ch. cristallinus*, as suggested by Sperber (1948, p. 64), not *Ch. langi*. The statocyst, hitherto not noticed by earlier workers, has been noticed in the present worms.

Chaetogaster sp. Svetlov (1924) also agrees with *cristallinus* except in the presence of a well-developed pharyngeal plexus. The presence or absence of pharyngeal plexus is not a constant and dependable character (Pointner, 1914, and Sperber, 1948).

In the present worms the transverse stomachal ducts are 26-30 (as against 20-22) ; setae of II, 168 μ and of others 136 μ long (as against 165 μ and 130 μ respectively) found in literature for this species.

b Subfamily Naidinae Lastockin, 1924

Key to all Genera and Subgenera of Naidinae

A-1 Dorsal bundles with crotchet-like or stout, straight needles only
  B-1 Needles crotchet-like ; several in a bundle
    C-1 Dorsal setae from II .. * *Homochaeta*
    C-2 Dorsal setae from VI .. * *Uncinais*
  B-2 Needles stout, straight, 1 per bundle .. * *Ophidonais*
A-2 Dorsal bundles with hairs and needles
  D-1 Prostomium with proboscis
    E-1 Ventral setae present in all segments from II, hairs not specially elongated
      F-1 Dorsal bundles with 8-18 hairs, 9-12 needles ; spermathecal ampulla spherical .. * *Arcteonais*
      F-2 Dorsal bundles with 1-3 hairs, 1-3 needles ; spermathecal ampulla elongated .. *Stylaria*
    E-2 Ventral setae absent in IV-V ; hairs especially elongated in VI-VIII .. * *Ripistes*

D-2 Prostomium without proboscis
G-1 Branchial processes present
H-1 Gills finger-like dorso-lateral processes ; 2 per segment anteriorly .. *Branchiodrilus*
H-2 Gills around anus in funnel-shaped organ at hind end
I-1 Ventral setae all of one type only .. * *Allodero*
I-2 Ventral setae of II-V sharply distinct from the rest
J-1 Branchial organ with palps .. *Aulophorus*
J-2 Branchial organ without palps .. *Dero*
G-2 Branchial processes absent
K-1 Dorsal bundles start from XVIII, XIX, or XX in adults .. *Haemonais*
K-2 Dorsal bundles start from IV, V, or VI
L-1 Asexual reproduction by fragmentation ; dorsal setae starting in VI .. *Allonais*
L-2 Asexual reproduction by budding
M-1 Dorsal bundles with strongly serrated hairs ; (simple pointed needles) .. * *Vejdovskyella*
M-2 Dorsal bundles with smooth hairs
N-1 Hair setae of VI very long ; body with rows of sensory papillae covered by foreign matter .. *Slavina*
N-2 No elongated hair setae
O-1 Ventral setae of II-V mostly sharply differentiated from the rest .. *Nais*
O-2 Ventral setae all of one type only
P-1 Eyes absent ; penial setae present .. * *Specaria*
P-2 Eyes present ; penial setae absent .. **Piguetella*

* Genera not known from the Indian sub-continent.

3. Genus **Nais** Müller, 1773

Generic characters : Dorsal setae from VI ; ventral setae of II—V differentiated from others. Pharynx in II—III ; pharyngeal and oesophageal glands present, chloragogues begin in VI, entire gut ciliated ; intestinal anti-peristalsis and ascending ciliary vibration occur. Septa developed ; no septal glands. Coelomocytes present. Dorsal vessel contractile, placed ventrally to the left for the most part and mid-dorsal in anterior 6 segments. Ventral vessel non-contractile and mid ventral. Nephridium composed of pre-septal ciliated nephrostome, followed

by a neck connecting the post-septal, consisting of a fusiform ampulla followed by a long ciliated coiled duct, partly enclosed in gland tissue, its ectal part opening by nephridiopore ventrally in front of the ventral bundles. Budding occurs; budding zones provide prostomium and 5 head segments to the posterior zooid, some hind segments to the anterior zooid before fission. Sperm-sac and ovi-sac are back-pouchings of septa 5/6 and 6/7 respectively, extending backwards, the former inside the latter.

Key to all the known and valid Species of NAIS

A-1 Needles spatulate .. **schubarti*

A-2 Needles single pointed

B-1 Ventral setae of II - V with distal tooth enormously elongated and hooked, proximal tooth reduced or vestigial .. **behningi*

B-2 Ventral setae of II-V, 2-5 per bundle and of normal shape

C-1 Needle seta more or less hair-like with long sharp tip

D-1 Nodulus slightly distal in needles; ventral setae from VI on much shorter, stouter and more curved than anterior ones, with prongs equally long; hairs and needles each up to 5 per bundle .. **barbata*

D-2 Nodulus 1/3 from tip in needles; ventral setae behind V thin, not strongly curved with distal tooth about 1.5 times as long as proximal; hairs and needles 1-3 per bundle .. ** pseudobtusa*

C-2 Needle seta with short fairly obtuse tip

E-1 Needles with nodulus 1/5-1/4 from tip; distal prong of ventral setae of II—V, twice as long and equally thick as proximal .. ** alpina*

E-2 Needles with nodulus 1/3 from distal end; ventral setae of II-V with distal prong thinner and longer than proximal

F-1 All ventral setae of about equal length .. ** andina*

F-2 Ventral setae of II-V longer than in following segments .. ** simplex*

A-3 Needles double-pointed

G-1 Ventral setae of some segments behind V very thick with distal prong several times as long as proximal

H-1 Thick ventral setae begin in VII; some segments (VIII—XIII) often have giant setae without proximal prong; stomach dilates slowly .. **bretscheri*

H-2 Thick ventral setae begin in VI; no giant setae; stomach dilates abruptly; enlarged cells project into lumen round the opening of oesophagus .. **pardalis*

G-2 No enlarged ventral setae at all

I-1 Needle teeth long, almost parallel; all ventral setae with distal prong twice as long as proximal .. *elinguis*

I-2 Needle teeth short diverging; prongs of ventral setae of approximately the same length

J-1 Ventral setae of II—V twice as long as those of following segments .. *raviensis*

J-2 Ventral setae of II—V slightly longer than those of following segments .. *variabilis*

J-3 Ventral setae all of about equal length

K-1 Needle teeth minute and equal; no swimming .. *communis*

K-2 Needle teeth distinct, proximal thicker than distal; swims by spiral movement .. *menoni* sp. nov.

7. **Nais communis** Piguet, 1906

Fig. 7A-F

Nais communis Piguet. Pointner, 1911, p. 631. Lastočkin. 1918, p. 58; 1924, p. 4; 1927, p. 66. Stephenson, 1922b, p. 280; 1931a, pp. 34-38. Hrabě 1937, p. 6; 1952, p. 4. Chen, 1944, p. 5. Berg, 1948, p. 40, fig. 31. Sperber, 1948, pp. 102-107, pl. VII, fig. 1; 1950, p. 60, pl. I, fig. 7; 1958, p. 46. Causey, 1953a, p. 55. Yamaguchi, 1953, pp. 286-288, fig. 6.

Nais communis var. *punjabensis* (Stephenson). Mehra, 1920, p. 457.

Material examined: Many worms collected from the Bugga stream, Cuddapah, in January 1956; from the Langford Town tank, Bangalore, in May 1958.

Worms delicate, pale white, with bright yellow pigment in I—VI. Prostomium bluntly triangular, containing coelomic fluid and corpuscles, and fringed with sensory hairs. Eyes at the base of the prostomium, black with violet tinge. Segmentation clear.

Dorsal setae from VI, 1 hair and 1 needle (rarely 2 of each) per bundle. Hair simple, nearly straight, smooth, 168-186 μ long. Needle

* Species not known from the Indian sub-continent.

(Fig. 7C) bifid, 56-65 μ long, with indistinct nodulus, about a third from distal end, shaft nearly straight below and gently curved above the nodulus. Teeth distinct, short, equal, and diverging. Ventral setae (Fig. 7A, B) begin in II, bifid, 3-5 per bundle, 70-90 μ long, with distal prong thinner and longer than the proximal ; nodulus proximal (D : P : : 14 : 10) in II—V, median (D : P : : 10 : 10) in VI, distal (D : P : : 10 : 12) in rest. Setae in II—V are less curved than in others.

Mouth ventral with prostomium overhanging. Pharynx in II—III, wide. Oesophagus in IV—VI, thin and wavy. Stomach in VII—VIII, broad anteriorly. Intestine thin in IX and wide from X. Anus postero-dorsal. Chloragocytes brownish. Coelomocytes spherical, 10 μ diameter, with greenish globules. Septa well developed.

Brain (Fig. 7E) incised deeply behind and less deeply in front.

Blood yellowish. Dorsal vessel divides anteriorly into 2, branches unite below the pharynx with ventral vessel. Lateral contractile vessels 3 pairs in III—V, first 2 pairs arise about the middle of III and IV, each branching into 2 ; third pair arises near the posterior septum of V and unbranched ; all vessels meet the ventral vessel.

First nephridium (Fig. 7F) in VII with its nephrostome in VI, succeeding segments have 2 nephridia each.

One fission zone common, 2 or 3 zones rare. In a chain of 4, first formed fission zone between XVI and XVII, second formed a segment in front, third formed some segments behind the first zone. Fission zones are in different stages of development.

Clitellum from $\frac{1}{2}$V—VII ($2\frac{1}{2}$ segments). Testes not observed. Ovaries a pair of light brown irregular bodies on the posterior face of septum 5/6. Sperm-sac and ovi-sac, back-pouchings of septa 5/6 and 6/7, former within the latter, extend to IX and X respectively. In sexual worms alimentary canal degenerates. Spermathecae ovoid in V with their openings in front of ventral bundle of V. Atrial ampullae roundish in VI, with their openings near the ventral setae of VI. Penial setae (Fig. 7D) 2 per bundle, 63 μ long in VI.

1 (living) = 4-5 mm. ; d (living) = 0.2 mm. ; s = 27-28 ; n = 15-19, 16 common.

Lengths of setae in μ and position of nodulus in the ratio D : P : :

	II	III	IV	V	VI	VII	VIII	IX	X
Hair	—	—	—	—	140	143.5	145	145	145
Needle :	—	—	—	—	45.5	49	49	49	52.5
					3:10	3:11	3:11	3:11	3:12
Crotchet:	84	80.5	77	77	70	80.5	77	77	73.5
	14 : 10	14 : 9	13 : 9	12 : 10	10 : 10	11 : 12	10 : 12	10 : 12	10 : 11

Distribution in Indian sub-continent: Kasauli, Agra (N. India); Khandala (W. India); Bheemanagar, Travancore (S. India); Lahore (Pakistan). Now recorded from Cuddapah (S. India).

Habits: Worms live in aquatic vegetation feeding on it and on protozoans, rotifers, etc. Occasionally they inhabit delicate tubes. They entangle themselves into knotty masses; on removal to a slide with some water, they disentangle and move away in all directions. Swimming absent.

Commensals: Sessile vorticellids are found attached to setae at either end of worms.

Parasites: Three sporozoans parasitise these worms. Numerous cysts of two actinomyxid sporozoan parasites, *Triactinomyxon naidanum* Naidu (1956) and *Triactinomyxon* sp. (Naidu, 1959b) were found in the intestinal wall of a few worms. Sporocysts of a microsporid sporozoan, *Mrazekia caudata* Leger & Hesse (Naidu, 1959a), were found in the coelom of two worms. These parasites cause the death of their host.

Remarks: Lengths of setae are slightly greater than those tabled out by Sperber (1948), p. 106, but fall within the extremes observed by her and those found in literature.

As suggested by Sperber (1948), the two Indian varieties *Nais communis punjabensis* and *N. c. caeca* of Stephenson (1923) have no taxonomic status, as they agree with the main form in all characters and differ from it only on trivial characters, the absence of pigmentation, shorter prostomium, finer teeth of needles; and the latter variety differs further in the absence of eyes. Absence of eyes cannot be taken as a character to create a new species, as it is found that forms without eyes have been met with in *Stylaria fossularis* also in the family.

Nais heterochaeta Benham (1893) and *N. parvula* Walton (1906) undoubtedly belong here as pointed out by Sperber (1948).

Nais communis and *N. communis* f. *magenta* reported by Marcus from Brazil, as suggested by Sperber (1948), belong to a new species distinct form *N. communis* already recorded from Peru, S. America (Piguet, 1928).

8. **Nais menoni**[1] sp. nov.

Fig. 8 A-F

Material examined: Numerous worms collected from the Bugga stream, Cuddapah, in January 1956; from Langford Town tank, Bangalore, in May 1958.

---

[1] Named after my teacher Sri P. Kotchukutta Menon, Professor of Zoology, Presidency College, Madras 5.

Worms small, slender, and brownish, without any pigmentation in I - V. Prostomium bluntly triangular with sensory hairs. Eyes absent.

Dorsal setae start in VI, 1 hair and 1 needle per bundle, hairs slightly bayonet-shaped, 140 - 175 μ long ; needles (Fig. 8B) bifid, sickle-shaped, 40 - 45 μ long, with distal conspicuous nodulus (D : P : : 2 : 10) and teeth equally thick, distal straighter and longer than the proximal.

Ventral setae (Fig. 8C) in II - V, 2-4 per bundle, less curved, 40-48 μ long, with proximal to median nodulus (D : P : : 7:6 or 6:6), distal prong 1.5 times longer than the proximal; the rest (Fig. 8D) 2-6 per bundle, 43-50 μ long, with distal nodulus (D : P : : 6 : 8) and prongs equally thick and long.

Pharynx in II - III, wide with a longitudinal slit in its roof and a protrusible diverticulum. Oesophagus in IV - VIII. Stomach IX - X, weak and gradual. Intestine sacculated; antiperistalsis and ascending ciliary action occur. Anus (Fig. 8A) postero-dorsal. Entire gut ciliated. Chloragocytes brownish, occur from VI onwards. Coelomocytes numerous, colourless, granular, and spherical (morula-like). No septal glands.

Brain (Fig. 8E) incised deeply in front and less deeply behind.

Blood yellowish. Dorsal vessel laterally attached to left of the gut up to VI and mid-dorsal in head segments. Pharyngeal vascular plexus formed by the loops of the dorsal vessel. No lateral contractile vessels.

First nephridium (Fig. 8F) in VIII with its pre-septal funnel containing nephrostome in VII on the left side; post-septal with fusiform brown ampulla followed by a long ciliated duct, partly free and partly enclosed in gland tissue, opening by nephridiopore ventrally.

Worms develop one budding zone at a time, buds off hinder part of anterior zooid and prostomium and head segments to the posterior zooid before fission.

Sexual worms not encountered.

1 (p*) = 2.5 — 3.0 mm. ; d(p*) = 0.2 mm.; s = 20—35 ; n = 22 in one.

For lengths of setae and position of nodulus see Table III.

Type : The type specimen is being deposited with the Zoological Survey of India, Calcutta.

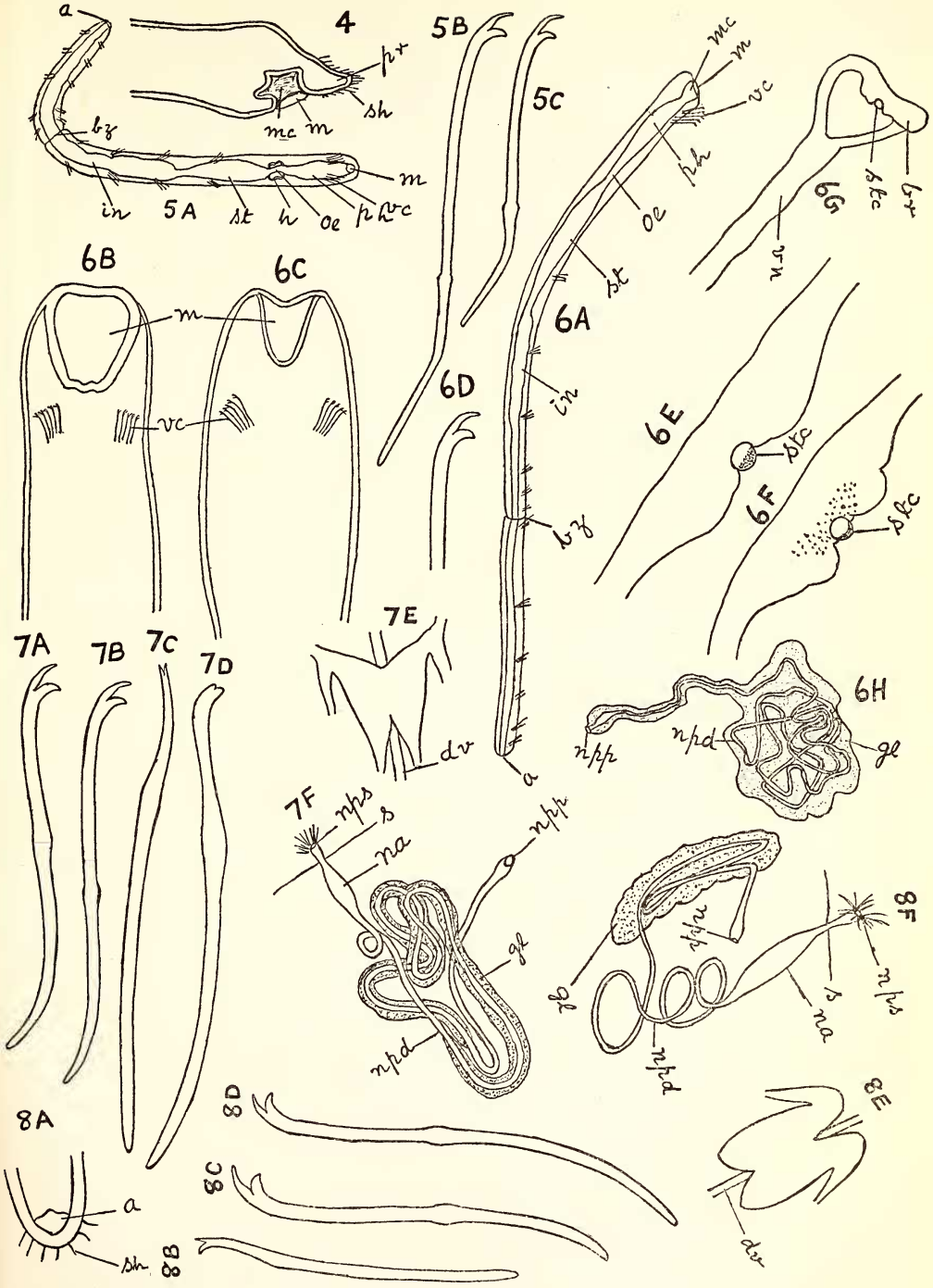
---

* Preserved

TABLE III

Lengths of setae in μ and the position of nodulus in the ratio D : P

	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
Hair	—	—	—	—	140	143.5	161	175	161	157.5	161	150.5
Needle	— —	— —	— —	— —	42 2:10	42 2:10	42 2:10	43.7 2.5:10	43.7 2.5:10	43.7 2.5:10	43.7 2.5:10	43.7 2.5:10
Crochet	47.2 7.5:6	45.5 7:6	42.0 6:6	43.7 6.5:6	47.2 6:7.5	49.0 6:8	49.0 6:8	49.0 6:8	49.0 6:8	45.5 5:8	45.5 5:8	45:5 5.8
do.	45.5 7:6	43.7 7:5.5	42.0 6:6	42.0 6:6	49.0 6:8	49.0 6:8	49.0 6:8	49.0 6:8	45.5 6:7	45:5 6:7	45.5 6:7	45.5 6:7
do.	43.7 7:5.5	42.0 7:5	40.2 6:5.5	— —	47.2 6:7.5	47.2 5.5:8	49.0 6.8	45.5 6:7	45.5 6:7	45.5 6:7	45.5 6:7	45.5 6:7
do.	— —	— —	— —	— —	47.2 6:7.5	43.7 5:7.5	— —	45.5 6:7	— —	43.7 5.5:7	— —	— —



Text-figures 4-8.

For explanations see p. 145.